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# SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE  
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION  
FOR THE ADVANCEMENT OF SCIENCE.

FRIDAY, FEBRUARY 10, 1905.

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MSS. intended for publication and books, etc., intended for review should be sent to the Editor of SCIENCE, Garrison-on-Hudson, N. Y.

## THE CARNEGIE INSTITUTION OF WASHINGTON.\*

### MINUTES OF SECOND MEETING OF THE BOARD OF TRUSTEES. [ABSTRACT.]

THE meeting was held in Washington, at the New Willard Hotel, on Tuesday, December 13, 1904, at 10 o'clock A.M. At 12:55 a recess was taken until 2 P.M. The chairman, Mr. Billings, occupied the chair. The secretary called the roll, and the following trustees responded: Messrs. Billings, Cadwalader, Dodge, Frew, Gilman, Hay, Higginson, Hitchcock, Hutchinson, Langley, Lindsay, Low, MacVeagh, Mills, Mitchell, Morrow, Root, Walcott, White and Wright. Absent: Messrs. Agassiz, Howe, Gage and Spooner. Letters were received from Messrs. Agassiz, Gage and Howe regretting their inability to be present.

The minutes of the last meeting of the board were presented, and on motion full reading was dispensed with and they were approved as per abstract furnished each member.

The president presented his resignation, as follows:

CARNEGIE INSTITUTION OF WASHINGTON,

December 13, 1904.

TO THE TRUSTEES OF THE CARNEGIE INSTITUTION.

*Gentlemen*: At your meeting, on December 8, 1903, I presented a letter saying:

"When I had the honor of being chosen the first president of the Carnegie Institution, I said to the trustees that from the nature of the case my tenure of office must be short, for, having passed the age of seventy years, I was looking forward to a release from serious official responsibilities.

\* From Year Book, No. 3.

The term of five years was fixed in the by-laws, and three of them will have passed at the next annual meeting of the board. It is my intention at that time to resign the office of president, and this early notice is given in order that the trustees may be prepared then to take such action as may seem to them wise."

In accordance with this intimation, I now resign the office of President of the Carnegie Institution, and, as the title of the chief executive may, perhaps, be changed, I will add that I am not a candidate for reappointment under any other designation.

In taking this step, I beg leave to assure the board of my continued interest in the development of this institution according to the purposes of the founder; and I express to the members of the board, collectively and individually, my highest respect.

It has been an honor and a privilege to be so closely associated as I have been with the organization and progress of an institution which bids fair to be a most potent factor in the advancement of knowledge and in the encouragement of scientific men.

I am, gentlemen, very respectfully yours,

DANIEL C. GILMAN.

The following motion was then offered and passed:

*Resolved*, That the resignation of President Gilman be accepted; and in thus severing the harmonious relations which have existed between the president and the board and the president and the executive committee the trustees desire to express their full appreciation of the prestige that the retiring officer has brought to the Carnegie Institution of Washington by his presidency.

The secretary referred to various details of business and submitted the cash statement and financial statement as shown below.

The secretary also reported that since October 31, 1904, he had collected on sales of publications \$589.01, and expended \$31,895.21, leaving a cash balance on hand of \$438,654.97 to date.

The consideration of the by-laws was next taken up.

After discussion and various suggestions as to the qualifications needed by a presi-

dent of the Carnegie Institution at Washington, a ballot resulted in the election of Dr. Robert S. Woodward, dean of the scientific faculty of Columbia University, New York.

The election of members of the executive committee to fill the vacancies caused by the expiration of the terms of Messrs. Billings and Walcott resulted in their reelection to the class of 1907.

On submission of the report of the executive committee the chairman and secretary made a general statement of the plan of work and financial outlook. After discussion and some minor changes, resolutions were passed making the following general appropriations:

Reserve fund.....	\$ 50,000
Publication fund, to be continuously available.....	40,000
Administration .....	50,000
Grants for departments and large projects .....	310,000
Grants for miscellaneous researches.....	168,000

At 4:50 P.M. the board adjourned.

*Financial Statement.*

	Dr.	Cr.
Endowment.....		\$10,000,000
Reserve Fund.....		200,000
Investments:		
U. S. Steel Corporation Bonds,		
5%.....	\$10,000,000	
\$100,000 Atch., Topeka and S.		
Fe Ry. Co. Gen'l Mtg. 4% 100-		
year Gold Bonds, Oct. 1, 1995.	100,112 50	
\$100,000 N. Pac. Ry. Co. Prior		
Lien Ry. and Land Grant		
Gold Bonds, Jan. 1, 1997, 4%...	101,800	
\$50,000 Northern Pacific-Great		
Northern 4% Joint Bonds,		
Chicago, Burlington and Q.		
collateral, July 1, 1921.....	46,500	
\$50,000 Lake Shore and Mich.		
Southern 4% D. Bonds.....	48,222 22	
Interest: Reserve fund invest-		
ment.....		10,000
Other investments....		380 69
Sales of publications.....		102 03
Grants: Large.....		69,321 24
Special .....		13,250 80
Minor .....		77,174 13
Publication.....		67,470 65
Administration.....		25,630 08
Furniture.....		1,065 51
Seal .....		1,500
Cash .....	469,961 17	
Available fund .....		300,700 76
	\$10,766,595 89	\$10,766,595 89

Receipts.		Amount.	Disbursements.		Amount.
1903.			Investments:		
October 31. Balance.....		\$445,471 69	\$50,000 N. Pacific-Gt. Northern 4 % Joint Bonds.....	\$ 46,500	
Interest:			\$50,000 N. Pacific Ry. Co. Prior L. Ry. and L. Grant 4's.....	51,312 50	
U. S. Steel Corporation.....	\$500,000		\$50,000 Atchison, Topeka and S. Fe. Ry. Co. G. Mtg. 4's.....	50,125	
Atchison, Topeka and S. Fe Ry. Co.....	5,000		\$50,000 Lake Shore and Mich. Southern 4 % D. Bonds.....	48,222 22	
N. Pacific Ry. Co.....	4,500				\$196,159 72
N. Pacific-Gt. Northern	2,500		Large grants.....	49,848 46	
Lake Shore and Mich- igan Southern.....	2,000		Minor grants.....	187,634 53	
Deposit U. S. Trust Co.	18,926 87		Special grants.....	29,749 20	
Deposit Am. Sec. and Trust Co.....	77 39		Publication.....		267,232 19
		\$533,004 26	Administration.....		11,590 82
Sales of publications:					36,967 15
Index Medicus.....	2,370 47				511,949 88
Year Book.....	52 85				
Other publications....	12 75				469,961 17
		2,436 07			
Revertments.....		329 33			981,911 05
Marine Biol. Lab., Tortugas, Fla.:					
A. G. Mayer.....	669 70				
		536,439 36			
		981,911 05			

CHAS. D. WALCOTT,  
*Secretary.*

#### REPORT OF EXECUTIVE COMMITTEE ON THE WORK OF THE YEAR.

The executive committee began consideration of the various directions and authorizations given by the board of trustees immediately after the adjournment of the board, December 8, 1903; also of matters recommended by the committee and approved by the board.

The work of the committee and its recommendations for the fiscal year 1904-1905 are shown in this report.

During the fiscal year the committee held eight meetings. Its organization continued the same as for the fiscal year 1902-1903. Mr. Gilman acted as chairman and Mr. Walcott as secretary.

#### APPROPRIATIONS.

At the annual meeting of the board, December 8, 1903, the following appropriations were made for large projects:

Tropical Pacific exploration.....	*\$40,000
Department of Experimental Biology.....	70,000
Department of Terrestrial Magnetism.....	20,000
Trans-Caspian Expedition, archeological exploration	18,000
Geophysical research.....	25,000
Investigation of mineral fusion and solution under pressure.....	\$50,012

\* It being impracticable to secure the services of the person whom the executive committee expected to take charge of this work, the project was abandoned and the appropriation not drawn upon.

Study of elasticity and plasticity of solid bodies upon finite deformation.....	7,500
Preparation of a bibliography of geophysics	5,000
Department of Economics and Sociology.....	30,000
Bureau of Historical Research.....	8,500
	\$211,500

#### REPORTS ON LARGE PROJECTS.

##### DEPARTMENT OF EXPERIMENTAL BIOLOGY.

The subject of research in zoology was before the executive committee at its earliest meetings, and was under consideration for nearly two years before the specific recommendations for any large projects directly in charge of the Carnegie Institution were presented to the board of trustees. In Year Book No. 1 the special advisory committee on zoology made several recommendations of a broad bearing, one of them being that of establishing a permanent biological laboratory as a central station for marine biology in general. In the same Year Book there were printed two schemes for the establishment of biological experiment stations for the study of evolution—one by Dr. C. B. Davenport, who favored Cold Spring Harbor, Long Island, and a second by Professor Roswell P. Johnson, who favored a protected marine shore near fresh-water ponds. The executive committee consulted with many experts and carefully investigated the feasibility of making the Marine Biological

Laboratory, at Woods Hole, Mass., a central station. This was found to be impracticable, and the executive committee stated in its report to the board of trustees for 1903 that it had concluded that the best mode of dealing with this important field of research was to organize a biological experimental department, to which could be referred all questions and problems of evolution, specific differentiation, heredity, etc. This was to include the establishment of an investigating station at Cold Spring Harbor, where ground and some buildings were offered, and also the establishment of a collection and experimental marine biological station at the Dry Tortugas.

The above conclusions were accompanied by a recommendation that the department be established and allotments made to begin the work. The board of trustees approved the recommendations.

The department of experimental biology was organized by the appointment of Dr. Charles B. Davenport as director of the Station for Experimental Evolution at Cold Spring Harbor, Long Island, and Dr. Alfred G. Mayer as director of the Marine Biological Laboratory at the Dry Tortugas, Florida.

A grant of \$34,250 was made to the station at Cold Spring Harbor, and of \$20,000 to the Marine Biological Laboratory at the Dry Tortugas.

#### DEPARTMENT OF ECONOMICS AND SOCIOLOGY.

For the present purposes of the department the following named eleven divisions have been established, and the gentlemen whose names appear have been placed in charge of them, respectively:

Division 1. Population and Immigration.—Professor Walter F. Willcox, Cornell University, Ithaca, N. Y.

Division 2. Agriculture and Forestry, including Public Domain and Irrigation.—President Kenyon L. Butterfield, Rhode Island College of Agriculture and Mechanic Arts, Kingston, R. I.

Division 3. Mining.—Mr. E. W. Parker, Geological Survey, Washington, D. C.

Division 4. Manufactures.—Hon. S. N. D. North, Census Office, Washington, D. C.

Division 5. Transportation.—Professor W. Z. Ripley, Newton Centre, Mass.

Division 6. Domestic and Foreign Commerce.—Professor Emory R. Johnson, University of Pennsylvania, Philadelphia, Pa.

Division 7. Money and Banking.—Professor Davis R. Dewey, Institute of Technology, Boston, Mass.

Division 8. The Labor Movement.—Carroll D. Wright, 1429 New York Avenue, Washington, D. C.

Division 9. Industrial Organization.—Professor J. W. Jenks, Cornell University, Ithaca, N. Y.

Division 10. Social Legislation, including Provident Institutions, Insurance, Poor Laws, etc.—Professor Henry W. Farnam, 43 Hillhouse Avenue, New Haven, Conn.

Division 11. Federal and State Finance, including Taxation.—Professor Henry B. Gardner, 54 Stimson Avenue, Providence, R. I.

#### TERRESTRIAL MAGNETISM.

The subject of an international magnetic bureau is fully presented by Dr. L. A. Bauer in 'Year Book' No. 2, accompanying papers, pp. 203–212. The executive committee recommended to the board of trustees that a grant of \$20,000 be made for magnetic research by the Carnegie Institution, it being proposed not to take up such magnetic work as is already well provided for by national bureaus, but only such as lies outside the proper sphere of activity of these bureaus, the nature of whose appropriations usually limit their work within the confines of their countries. Furthermore, the purpose is to gather together and unite in one harmonious whole all existing knowledge and facts, so that the directions in which future work can most profitably be accomplished will be set forth. The investigations promise not only to have scientific utility, but to reach results of great practical importance, *e. g.*, the determination of the magnetic data necessary for safe navigation at sea.

The favorable action of the trustees at the annual meeting in December, 1903, and the reference of the project to the executive committee resulted in the formation of a department of international research in terrestrial magnetism, with Dr. L. A. Bauer as director, and with authorization to begin work April 1, 1904. The first allotment was \$20,000.

#### TRANS-CASPIAN ARCHEOLOGICAL EXPEDITION.

(Raphael Pumpelly, Newport, R. I., in charge. \$18,000.)

In Year Book No. 2, pages 271-287, there is a brief report of Professor Raphael Pumpelly's first expedition to the Trans-Caspian region. The second expedition was for the purpose of archeological investigations in special areas noted on the first expedition. The following report is an indication of the character of the results obtained. The final report will be prepared as soon as practicable.

Professor Pumpelly left America in December, 1903. A week was passed in Berlin, where he engaged as archeologist Dr. Hubert Schmidt, of the Museum für Völkerkunde. Dr. Schmidt had excavated at Troy under Dörpfeld, and is an expert in prehistoric pottery. A month was passed in St. Petersburg in getting permission to excavate in Turkestan.

On the twenty-fourth of March work was begun at Anau, near Askhabad. The members of the party were Dr. Hubert Schmidt, archeologist; Ellsworth Huntington, R. W. Pumpelly; Langdon Warner, Hildegard Brooks, Homer Kidder, volunteer assistants.

#### SECONDARY GRANTS.

The following is a record of the grants, not already mentioned, made under the allotment of \$200,000 for minor grants. A few reports on grants made in 1902-1903 are included, as the work under them was continued into the fiscal year 1903-1904:

#### ANTHROPOLOGY.

GEORGE A. DORSEY, Field Columbian Museum, Chicago, Ill. For ethnological investigation among the tribes of the Caddoan stock. \$2,500.

WILLIAM H. HOLMES, director of Bureau of American Ethnology, Washington, D. C. For obtaining evidence relative to the history of early man in America. \$2,000.

#### ARCHEOLOGY.

FREDERICK J. BLISS, New York, N. Y. For excavations in Syria and Palestine. \$1,500.

GEORGE F. KUNZ, New York, N. Y. To investigate the precious stones and minerals used in ancient Babylonia, in connection with the investigation of Mr. William Hayes Ward. \$500.

W. MAX MULLER, Philadelphia, Pa. For investigating monuments of Egypt and Nubia. \$1,500.

WILLIAM HAYES WARD, New York. For a study of the oriental art recorded on seals, etc., from western Asia. \$1,500.

#### ASTRONOMY.

LEWIS BOSS, Dudley Observatory, Albany, N. Y. For astronomical observations and computations. \$5,000.

W. W. CAMPBELL, Lick Observatory, Mount Hamilton, Cal. For pay of assistants in researches at Lick Observatory. \$4,000.

HERMAN S. DAVIS, Gaithersburg, Md. For a new reduction of Piazzi's star observations. \$1,500.

GEORGE E. HALE, Yerkes Observatory, Williams Bay, Wis. For measurements of stellar parallaxes; solar photographs, etc. \$4,000.

SIMON NEWCOMB, Washington, D. C. For determining the elements of the moon's motion and testing law of gravity. \$2,500.

W. M. REED, Princeton Observatory, Princeton, N. J. For pay of two assistants to observe variable stars. \$1,000.

SOLAR OBSERVATORY, MOUNT WILSON, CAL., Dr. George E. Hale, director. \$15,000.

MARY W. WHITNEY, Vassar College, Poughkeepsie, N. Y. For measurement of astronomical photographs, etc. \$1,000.

#### BIBLIOGRAPHY.

ROBERT FLETCHER, Army Medical Museum, Washington, D. C. For preparing and publishing the Index Medicus. \$10,000.

EWALD FLÜGEL, Stanford University, Cal. For the preparation of a lexicon to the works of Chaucer. \$7,500.

HERBERT PUTNAM, Washington, D. C. For preparing and publishing a handbook of learned societies. \$5,000.

## BOTANY.

DESERT BOTANICAL LABORATORY. Frederick V. Coville, Washington, D. C., and D. T. MacDougal, New York, N. Y., advisory committee. \$5,000.

BURTON E. LIVINGSTON, University of Chicago, Chicago, Ill. For investigations of the relations of desert plants to soil moisture and to evaporation. \$400.

E. W. OLIVE, University of Wisconsin, Madison. For researches on the cytology of certain lower plants. \$1,000.

V. M. SPALDING, Tucson, Arizona. For investigation of absorption and transpiration of water by desert shrubs. \$600.

## CHEMISTRY.

JOHN J. ABEL, Johns Hopkins University, Baltimore, Md. For study of the chemical composition of the secretion of the supra-renal gland. \$500.

WILDER D. BANCROFT, Cornell University, Ithaca, N. Y. For a systematic chemical study of alloys. \$500.

CHAS. BASKERVILLE, College of the City of New York, New York City. For investigations of the rare earths. \$1,000.

GREGORY T. BAXTER, Cambridge, Mass. For research upon the atomic weight of manganese. \$500.

MOSES GOMBERG and LEE H. CONE, Ann Arbor, Mich. For study of triphenylmethyl and analogous compounds. \$500.

H. C. JONES, Johns Hopkins University, Baltimore, Md. For investigations in physical chemistry. \$1,000.

W. L. MILLER, University of Toronto, Toronto, Canada. For the study of electric migrations in solutions of weak acids. \$500.

H. N. MORSE, Johns Hopkins University, Baltimore, Md. For development of a method for the measurement of osmotic pressure. \$1,500.

A. A. NOYES, Massachusetts Institute of Technology. For researches upon: (1) Electrical conductivity of salts in aqueous solution at high temperatures; (2) Ionization of weak acids and bases and hydrolysis of their salts in aqueous solution at high temperatures; (3) Transference determinations in aqueous solutions of acids. \$1,000.

THOMAS B. OSBORN, New Haven, Conn. For research on chemical substances yielded by proteids of the wheat kernel when decomposed by acids. \$1,500.

THEODORE W. RICHARDS, Harvard University, Cambridge, Mass. For investigation of the value of atomic weights, etc. \$2,500.

HENRY S. WASHINGTON, Locust, N. J. For the chemical investigation of igneous rocks. \$1,200.

## ENGINEERING.

W. F. DURAND, Stanford University, California. For experiments on ship resistance and propulsion. \$4,120.

W. F. M. GOSS, Purdue University, Lafayette, Ind. For a research to determine the value of high steam pressures in locomotive service. \$5,000.

## EXPERIMENTAL PHONETICS.

E. W. SCRIPTURE, Yale University, New Haven, Conn. For researches in experimental phonetics. \$2,700.

## GEOLOGY.

T. C. CHAMBERLIN, University of Chicago, Chicago, Ill. For study of fundamental principles of geology. \$6,000.

BAILEY WILLIS, U. S. Geological Survey, Washington, D. C. For geological exploration in eastern China. \$12,000.

## GEOPHYSICS.

FRANK D. ADAMS, McGill University, Montreal, Canada. For investigation on flow of rocks. \$1,500.

G. K. GILBERT, Washington, D. C. For preparing plans for investigating subterranean temperatures. \$1,000.

## HISTORY.

ANNIE HELOISE ABEL, New Haven, Conn. For investigating the early Indian policy of the United States. \$150.

WILLIAM WIRT HOWE, New Orleans, La. For preliminary inquiry into the subject of an investigation on legal history and comparative jurisprudence. \$1,000.

## MATHEMATICS.

DERRICK N. LEHMER, Berkeley, Cal. For pay of assistants to make the entries in a table of smallest divisors. \$500.

E. J. WILCZYNSKI, Berkeley, Cal. For investigation of ruled surfaces, etc. \$1,800.

## PALEONTOLOGY.

OLIVER P. HAY, American Museum of Natural History, New York, N. Y. For monographing the fossil chelonians of North America. \$3,000.

G. R. WIELAND, Yale University, New Haven, Conn. For continuation of researches on living and fossil cycads, and illustration of memoir on the structure of the latter. \$2,300.

## PHYSICS.

S. J. BARNETT, Stanford University, Cal. For research on the electric displacement induced in a certain dielectric by motion in a magnetic field. \$250.

WILLIAM CAMPBELL, Columbia University, New York, N. Y. For research on the heat treatment of some high-carbon steels. \$1,500.

H. S. CARHART, University of Michigan, Ann Arbor, Mich. For preparation of material for standard cells, etc. \$500.

C. D. CHILD, Colgate University, Hamilton, N. Y. For investigation of the ionization in the neighborhood of a mercury arc in a vacuum. \$50.

HENRY CREW, Evanston, Ill. For study of certain arc spectra. \$1,000.

GEORGE E. HALE, Mount Wilson, Cal. For experiments on the use of fused quartz for the construction of optical mirrors. \$3,000.

E. PERCIVAL LEWIS, University of California, Berkeley, Cal. To investigate vacuum-tube spectra of gases and vapors. \$500.

A. A. MICHELSON, University of Chicago, Chicago, Ill. For aid in ruling diffraction gratings. \$1,500.

R. W. WOOD, Johns Hopkins University, Baltimore, Md. For research, chiefly on the theory of light. \$500.

## PHYSIOLOGY.

W. O. ATWATER, Wesleyan University, Middletown, Conn. For investigations in nutrition. \$7,000.

RUSSELL H. CHITTENDEN, Sheffield Scientific School of Yale University, New Haven, Conn. For a study of the minimal proteid requirement of the healthy man. \$1,500.

ARTHUR GAMGEE, Montreux, Switzerland. For preparing a report on the physiology of nutrition. \$6,500.

HIDEYO NOGUCHI, University of Pennsylvania, Philadelphia, Pa. For continuation of the studies on snake venoms. \$1,700.

EDWARD T. REICHERT and AMOS P. BROWN, University of Pennsylvania, Philadelphia, Pa. For research on the crystallography of hæmoglobin. \$1,000.

## ZOOLOGY.

A. J. CARLSON, Stanford University, Cal. For research on the physiology of the invertebrate heart. \$100.

W. E. CASTLE and E. L. MARK, Museum of Comparative Zoology, Cambridge, Mass. For experimental studies in heredity. \$500.

HENRY E. CRAMPTON, Columbia University, New York, N. Y. For determining the laws of varia-

tion and inheritance of certain lepidoptera. \$500.

J. E. DUERDEN, University of Michigan, Ann Arbor, Mich. For continuation of investigation on the morphology and development of recent and fossil corals. \$1,500.

CARL H. EIGENMANN, University of Indiana, Bloomington, Ind. For investigation of blind fishes in Cuba. \$1,000.

L. O. HOWARD, Department of Agriculture, Washington, D. C. For preparing a report on American mosquitoes. \$2,500.

C. E. MCCLUNG, Kansas University, Lawrence, Kans. For making a comparative study of the spermatogenesis of insects, etc. \$500.

WILLIAM PATTEN, Hanover, N. H. For studies relating to the origin of vertebrates. \$500.

RAYMOND PEARL, University of Michigan, Ann Arbor, Mich. For an investigation by statistical methods of correlation in variation. \$500.

W. L. TOWER, University of Chicago, Chicago, Ill. For an investigation of the potato beetles of Mexico. \$445.

H. V. WILSON, University of North Carolina, Chapel Hill, N. C. For morphology and classification of deep-sea sponges. \$1,000.

N. YATSU, Columbia University, New York. For experimental studies of the Nemertine egg. \$300.

MARINE BIOLOGICAL LABORATORY, Woods Hole, Mass. J. Blakely Hoar, treasurer. For maintenance of 20 tables. \$10,000.

NAPLES ZOOLOGICAL STATION, Naples, Italy. For maintenance of two tables. \$1,000.

## RESEARCH ASSISTANTS.

The policy in relation to research assistants, as outlined in Year Book No. 2, pp. xlvii-xlviii, was continued, and the persons below named conducted investigations in the branches of science indicated:

C. E. ALLEN, Madison, Wis. For a study of the homologies of the gametophyte and sporophyte, etc. \$1,000.

A. F. BLAKESLEE, Cambridge, Mass. For an investigation of sexuality in the lower fungi. \$1,000.

W. W. COBLENTZ, Cornell University, Ithaca, N. Y. For investigating infra-red emission and absorption spectra. \$1,000.

A. L. DEAN, New Haven, Conn. For investigating the proteolytic enzymes of plants. \$1,000.

L. E. DICKSON, University of Chicago, Chicago, Ill. For certain mathematical investigations. \$1,000.



H. W. Doughty, Johns Hopkins University, Baltimore, Md. For an investigation of camphoric acid, under the direction of Professor A. A. Noyes. \$1,000.

C. B. Farrar, Towson, Md. For psychological experiments at the Sheppard and Enoch Pratt Hospital. \$1,000.

William Jones, New York, N. Y. For investigating the religion of the central group of Algonkian Indians. \$1,000.

A. S. King, Bonn, Germany. For the production and study of emission spectra at high temperatures. \$1,000.

P. A. Levene, New York, N. Y. For researches along the line of determining points in the constitution of proteids. \$1,000.

R. S. Lillie, University of Nebraska, Lincoln, Nebr. For a study of the relation of ions to the various forms of protoplasmic movement. \$1,000.

G. D. Louderback, San Francisco, Cal. For a study of the glaucophane and associated schists. \$1,300.

F. E. Lutz, Bloomsburg, Pa. For study of organic evolution at Station for Experimental Evolution, Cold Spring Harbor, Long Island. \$1,000.

U. B. Phillips, University of Wisconsin, Madison, Wis. For a study of the influence of plantation in political and social history of the south. \$300.

F. E. Ross, Washington, D. C. For astronomical investigation, under Professor Simon Newcomb.

L. S. Rowe, University of Pennsylvania, Philadelphia, Pa. For a study of Mexican constitutional system. \$1,200.

P. E. Sargent, Cambridge, Mass. For an investigation in comparative neurology. \$1,000.

G. W. Scott, Philadelphia, Pa. For a study of private claims against foreign nations to which the United States has been a party. \$1,200.

E. S. Shepherd, Cornell University, Ithaca, N. Y. For a systematic study of alloys, with especial reference to brasses and bronzes. \$1,000.

G. H. Shull, University of Chicago, Chicago, Ill. For an investigation in heredity, hybridization, variation, mutation, etc. \$1,000.

Mary Roberts Smith, Palo Alto, Cal. For studying the history and social conditions of the Chinese immigration in California. \$1,000.

Nettie M. Stevens, Bryn Mawr College, Bryn Mawr, Pa. For an investigation of problems relating to sex determination, etc. \$1,000.

J. B. Whitehead, Johns Hopkins University, Baltimore, Md. For study of the magnetic effect of electrical displacement. \$1,200.

E. J. Wilczynski, Berkeley, Cal. For an investigation of ruled surfaces, etc. \$1,800.

Fritz Zerban, Munich, Germany. For an investigation of rare earths, under the direction of Professor C. Baskerville. \$1,000.

#### PUBLICATIONS.

The following publications have been issued during the year:

Year Book No. 2, 1903. Octavo, 371 pages.

'Report of Committee on Southern and Solar Observatories.' Extracted from Year Book No. 2. Octavo, 170 pages.

'Desert Botanical Laboratory of Carnegie Institution.' Publication No. 6. By F. V. Coville and D. T. MacDougal. Octavo, 58 pages 29 plates.

'New Method of Determining Compressibility.' Publication No. 7. By T. W. Richards and W. N. Stull. Octavo, 45 pages, 5 text figures.

'Contributions to Stellar Statistics.' First paper. On the Position of the Galactic and other Planes toward which the Stars tend to Crowd. Publication No. 10. By Simon Newcomb. Quarto, 30 pages.

'Production of Sex in Human Offspring.' Publication No. 11. By Simon Newcomb. Octavo, 34 pages.

'The Action of Snake Venom upon Cold Blooded Animals.' Publication No. 12. By Hideyo Noguchi. Octavo, 16 pages.

'The Influence of Grenville on Pitt's Foreign Policy, 1787-1898.' Publication No. 13. By E. D. Adams. Octavo, 79 pages.

'Guide to the Archives of the Government at Washington.' Publication No. 14. Octavo, 250 pages.

'Fecundation in Plants.' Publication No. 15. By D. M. Mottier. Octavo, 187 pages.

'Contributions to the Study of the Behavior of the Lower Organisms.' Publication No. 16. By H. S. Jennings. Octavo, 256 pages.

'Traditions of the Arikara.' Publication No. 17. By G. A. Dorsey. Octavo, 202 pages.

'Researches on North American Acridiidae.' Publication No. 18. By Albert P. Morse. Octavo, 56 pages, 8 plates.

The following are in press:

'Coloration in *Polistes*.' Publication No. 19. By Wilhelmine M. Enteman. Octavo, 88 pages, 6 colored plates.

'The Coral *Siderastraea radians*.' Publication No. 20. By J. E. Duerden. Quarto, 144 pages, 11 plates.

'Mythology of the Wichita.' Publication No. 21. By G. A. Dorsey. Octavo, 353 pages.

'The Waterlilies.' Publication No. 22. By H. S. Conard. Quarto, 280 pages, 30 plates.

'Bacteria in Relation to Plant Diseases.' By Erwin F. Smith. Quarto.

'Explorations in Turkestan.' By R. Pumpelly, R. W. Pumpelly, W. M. Davis and Ellsworth Huntington. Quarto.

'Collected Mathematical Works of G. W. Hill.' It is estimated that these works will make four quarto volumes. Volume I. is in type.

'Catalogue of Double Stars.' By S. W. Burnham. 350 pages in type.

The following are authorized:

'Evolution, Racial and Habitudinal, controlled by segregation.' By J. T. Gulick.

'Chimera—a Memoir on the Embryology of Primitive Fishes.' By Bashford Dean. Manuscript not received, but plates are prepared.

'Bibliographic Index of North American Fungi.' By W. G. Farlow. Will make five octavo volumes. 250 pages in type.

'Results of Investigations of Poison of Serpents.' By Drs. Simon Flexner and Hideyo Noguchi. Manuscript not received.

'Heredity of Coat Characters in Guinea Pigs and Rabbits.' By W. E. Castle.

'Mutants and Hybrids of the *Oenotheras*.' By D. T. MacDougal.

'Astronomical Manuscript.' By C. H. F. Peters.

'Memoir on Fossil Cycads.' By G. R. Wieland.

'Description of the New Oxygen Apparatus Accessory to the Calorimeter.' By W. O. Atwater.

'Rotation of the Sun as Determined from Motion of the Calcium Flocculi.' By G. E. Hale and Philip Fox.

#### LIST OF ACCOMPANYING PAPERS.

'A Study of the Conditions for Solar Research at Mount Wilson, California.' By George E. Hale.

'The Southern Observatory Project.' By Lewis Boss.

'Methods for Promoting Research in the Exact Sciences.' By Dr. Simon Newcomb, Professor H. H. Turner, Karl Pearson, Lord Rayleigh, G. H. Darwin, Arthur Schuster, Edward C. Pickering.

'Fundamental Problems of Geology.' By T. C. Chamberlin.

'Plans for Obtaining Subterranean Temperatures.' By G. K. Gilbert.

'Proposed Magnetic Survey of the North Pacific Ocean.' By L. A. Bauer and G. W. Littlehales, Capt. E. W. Creak, Superintendent O. H. Tittmann.

'Geological Research in Eastern Asia.' By Bailey Willis.

#### MATHEMATICAL PROGRESS IN AMERICA.\*

IN the remarks that follow I shall limit myself to a brief consideration of progress in pure mathematics. This I may do the more appropriately inasmuch as one of my predecessors, Professor R. S. Woodward, at the annual meeting of 1899 gave an account of the advances made in applied mathematics during the nineteenth century. In his address, which was published in the *Bulletin of the American Mathematical Society*, for January, 1900, is included a description of the more important advances made by Americans in the field of applied mathematics.

In tracing the development of pure mathematics in America it seems convenient to recognize three periods. The first period extends from colonial days up to the establishment of the Johns Hopkins University in 1876; the second period extends from the establishment of the Johns Hopkins University up to 1891, when the New York Mathematical Society took on a national character and began the publication of its *Bulletin*; the third period extends from 1891 up to the present time.

The most valuable source from which the general reader may secure information in regard to the first period mentioned above is a work entitled 'The Teaching and History of Mathematics in the United States.' This work, written by Professor Florian Cajori, was published in 1890 by the United States Bureau of Education.†

Before the founding of the Johns Hopkins University there was almost no attempt made to prosecute or even to stimulate in a systematic manner research in the field of pure mathematics. Such mathematical journals as were published were scientifically of little importance and as a

\* Presidential address delivered at the annual meeting of the American Mathematical Society, December 29, 1904.

† Circular of Information No. 3, 1890.